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EFFECTS OF FINANCIAL AND NON-FINANCIAL INFORMATION DISCLOSURE ON PRICES' MECHANISMS FOR EMERGENT MARKETS:

THE CASE OF THE ROMANIAN BUCHAREST STOCK EXCHANGE

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ABSTRACT

The issuance of the European Union Regulation (EC) 1606/2002 and the 2007 adoption of the Markets and Financial Instruments Directive in Romania determined us to sett the goal of the present study at investigating the impact of public information disclosure on market values in the case of the Romanian companies listed on Bucharest Stock Exchange. Our focus is mainly on comparing the value relevance of Internet disclosed information provided by annual and interim financial reports and other non-financial news in the decision making process of investors. Consistent with the literature, we anticipate a positive and significant incremental relevance of such information items, even if an important non-uniformity of prices' adjustments can be expected. In order to have a benchmark for our results, we compare these with the ones specific to a more developed market, the Madrid Stock Exchange. Empirical tests support our research hypothesis according to which there will be a relative incremental value of a higher volume and a better quality of information, reflecting prices' overreactions even in the case of a market with imperfect trading mechanisms.

KEY WORDS

Disclosure, Valuation, Bucharest Stock Exchange, Madrid Stock Exchange

JEL Classification: D81, D83

1. INTRODUCTION

This study is motivated by the European Union's (EU) decision to require the use of the International Financial Reporting Standards (IFRSs) for the consolidated financial statements of all listed companies (Regulation (EC) 1606/2002) and by the 2007 Romanian adoption of the *Markets and Financial Instruments Directive* (MiFID) - which is the cornerstone of the European Commission's *Financial Services Action Plan*. These regulations are designed to strengthen the European Union's legislative framework in regard to investment services and regulated markets, with a view to furthering two major objectives: (a) to protect investors and safeguard market integrity by establishing harmonised requirements in governing the activities of authorised intermediaries and, respectively, (b) to promote fair, transparent, efficient and integrated financial markets. MiFID has retained the principles of the EU „passport" established by the Investment Services Directive (ISD), but introduced the concept of „maximum harmonisation" which places more emphasis on home state supervision. Since MiFID requires listed companies to publish the price, volume and time of all trades in listed shares, even if executed outside of a regulated market, unless certain requirements are met to allow for deferred publication, this regulation implies, *inter alia*, the disclosure of a larger quantity of information for the listed companies in order to support the investors and to ensure a regular and transparent decisional base.

Several studies (Ferrarini and Recine, 2006, Moloney, 2007, Chiu, 2007, Jackson, 2009, Posner and Véron, 2010, Armstrong et al., 2007, Agostino et al., 2008, Beneish et al., 2009) assess the potential impact of IFRSs adoption and MiFID implementation on market efficiency and investors' protection. Still, only a limited number of these examine the value relevance effects of MiFID implementation and of the mandatory adoption of IFRSs by the European Union's Member States, especially in the case of the new emergent markets (see Aharony et al. 2010).

By taking into account this situation, the goal of our study is to investigate the impact of public information disclosure on market values for the Romanian companies listed on Bucharest Stock Exchange. We achieve this by relating *Prices to Earnings Ratios* (PER) to a set of dummies designed to reflect the financial and non-financial information publicly disclosed through the companies'

websites. Following previous studies, we view the value relevance of financial and non-financial information as an association between this information and stock market values.

In order to have a benchmark for our results, we compare these outcomes with the ones specific to a developed market, the Madrid Stock Exchange. It is a country-specific study and, consequently, it has only a limited analytical objective without providing a broader overview. However, the results obtained can be generalized, with some limitations, to other developing markets, if some common characteristics like rigid prices' mechanisms, low liquidity, incomplete trade mechanisms and limited set of financial assets available for trade apply.

We are particularly interested in comparing the value relevance of Internet disclosed information provided by annual and interim financial reports and other non-financial news in order to highlight the behaviour of the investors in respect to this type of information. Consistent with the literature, we anticipate a positive and significant incremental relevance of such information items even if an important non-uniformity of prices' adjustments can be expected.

We are focusing on the third quarter of 2010 data, considering that the 2007-2010 time span is large enough to allow us to observe some noticeable effects of MiFID implementation.

We assume that there are no changes in market efficiency post MiFID adoption and that investors react to new information by taking into account not only the recent prices' history, but also some fundamental descriptors of issuers' activity. Specifically, we base our approach on the large framework of valuation literature extended with the idea that next to the financial information, the non-financial information shocks should be considered in the description of investors' portfolio related decisions.

To evaluate the overall impact of information disclosure, we have built a global disclosure indicator according to the so-called *Principal Components Analysis* by including individual disclosure dummies. The involved methodology implies that closer the global indicator to one, higher the level of disclosure specific to the respective company. This indicator is used to assess the effects induced by global information disclosure on prices (adjusted to issuers' performances).

The contributions of the study are subsumed to several analytical directions. Firstly, we examine the value relevance effects of the information disclosed by listed companies on an emergent market.

Secondly, we provide a benchmark evaluation of our results. Thirdly, we find that there is a significant degree of heterogeneity for investors' decisions to new information arrived on the market. Furthermore, we show that the proposed global disclosure indicator is associated with prices' adjustments, even if the considered market cannot be characterized as an efficient one.

The remainder of the paper is organized as follows. In Section 2, we briefly review the valuation literature and we develop our research hypothesis. In Section 3 we present the data and the methodological approach. Section 4 discuss the results and provides additional robustness tests and Section 5 concludes.

2. PRIOR RESEARCH AND HYPOTHESES DEVELOPMENT

Disclosure and valuation literature

The disclosure of financial information has been for long the subject of an important stream of literature. Understanding investors' reaction to new information is an important question that many managers are facing in the process of decision making. Zhang (2006) shows that informational uncertainty contributes to investors' underreaction to new information. Hirshleifer (2001) and Daniel et al. (1998, 2001) argue that uncertainty intensifies psychological biases. Dumontier and Raffournier (2002) consider that companies release more frequently voluntary information.

Bessiere and Sentis (2007) have examined the link between uncertainty and investors reaction to goodwill write-offs (GWWos). They study a sample of French firms during 2001-2004, based on the framework of Daniel et al. (1998) who posits that overconfidence leads to an overreaction to private information, followed by short adjustments when the information becomes public and, then, a long adjustment which reduces slowly the mispricing in the long run. Their tests confirmed the overconfidence effect on investors' reaction: the high-uncertainty sample was characterized by strongly negative abnormal returns during the period preceding GWWOs announcement, associated with high volatility. They concluded that in the long run the overreaction to private information was

corrected and there were observed positive abnormal returns, creating a reversal. Their results offer new perspectives about informativeness and timeliness of corporate voluntary disclosure.

The release of Regulation (EC) 1606/2002, requiring all European Union (EU) publicly traded companies to prepare consolidated financial statements based on IFRSs beginning at fiscal year-end December 2005, was the main motivation of Aharony et al. (2010) in investigating the impact of IFRSs adoption in 14 European countries. By comparing the price and return-based value relevance models, they assessed how switching from domestic standards affects the informativeness of accounting numbers to investors. Aharony et al. (2010) compare the value relevance of three particular accounting information items - goodwill, research and development expenses (R&D) and revaluation of property, plant and equipment (PPE) - in 14 European countries, measured alternatively according to local GAAP in the year before and according to IFRSs immediately after their mandatory adoption. Their study focused on whether mandatory adoption enhances the value relevance of accounting information. Their results suggested that in the pre-IFRS mandatory adoption year their three items of interest had greater incremental value relevance to investors in equity securities, when domestic standards were compatible with IFRSs; and that investors benefited most from implementing IFRSs for goodwill, R&D expenses and asset revaluation in EU countries where local standards deviated more from IFRSs.

Adopting IFRSs was considered a major change in the history of financial reporting and in the convergence of national accounting systems (Larson and Street, 2004; Schipper, 2005; Whittington, 2005).

Daske et al. (2008) argue that the capital market effects - in the case of mandatory IFRS adopters - are stronger in countries that have bigger differences between local GAAP and IFRSs and that these capital market effects only occur in countries with relatively strong legal and enforcement regimes and where the institutional environment provides strong incentives for transparent reporting.

Reporting according to IFRSs increases transparency and improves the quality of financial reporting. IFRS are more fair value oriented and more comprehensive, especially with respect to disclosures, than most local GAAP (Aharony et al.2010). In addition, Daske and Gebhardt (2006) provide evidences that the perception of disclosure quality increases around voluntary IFRSs adoption; and

Barth et al. (2008) report an increase in earnings' quality for a sample of firms that adopted IFRSs voluntarily. Recent studies indicate that accounting standards alone play a limited role in determining observed reporting quality; rather, firms' reporting incentives are pivotal in this respect (Ball et al., 2000; Ball and Shivakumar, 2005; Burgstahler et al., 2006). Consequently, changing the standards alone is not sufficient to improve the informativeness of the reported accounting numbers. For example, Ball (2006) and Daske et al. (2007) suggest that firms opposing the transition to IFRSs or towards more transparency are unlikely to make material changes to their reporting policies.

Core et al. (2001) have studied a sample of over 100 000 firms from the United States (US) during 1975-1999 to investigate whether traditional financial variables are related to firm value in the same way as in prior periods, as there were claims that contradicted this and sustained that US was in a New Economy Period (NEP). In the respective study, they have also analyzed subsets of firms that were considered important in the NEP: high-technology companies and new arrivals. They have examined whether, and to what extent, traditional proxies for future cash flows are relevant for explaining equity values of companies operating in the NEP. They found that the ability of traditional financial variables to explain firm value decreased for all subsamples in the NEP, and they provided evidence that this was not caused by an unstable relation between firm value and traditional financial variables (earnings, book value and growth opportunities).

Dang and Hakenes (2010) argue that disclosure of information triggers immediate price movements, but it mitigates price movements at a later date, when the information would have become public. Disclosure policy can be interpreted as a tool to "control" interim asset price movements, and to allocate risk intertemporally. Dang and Hakenes (2010) showed that a policy of partial disclosure (and, hence, of intertemporal risk sharing) can maximize, but surprisingly also minimize, the market value of the firm. Disclosure regulation needs to be fine-tuned, and it can differ between firms or assets with different ownership structures, different risk structures, different payoff profiles, and different degree of liquidity.

The superior forecast ability of the two-year residual income valuation (RIV) model of Ohlson (1995) over the two-year Ohlson and Juetnner-Nauroth model (2005) (the so-called „OJ" model) is

documented in Penman (2005) and Brief (2007). They cast doubt on the preference of OJ model over RIV model in providing more accurate forecast of firm valuation.

Akintoye (2008) discussed the issue of information adequacy and redundancies of annual financial reports in Nigeria, as he considered that the most widely used sources of information are the company's published financial statements and reports play an important role in the dissemination of corporate information. In the respective study, the author examined the impact of accounting information on stock prices, block trades, new issues, stock splits and mutual fund performance. Most of his evidence was consistent with the weak and semi-strong forms of market efficiency but inconsistent with the strong form. In certain situations, individuals with inside information appeared to be able to earn abnormal returns.

Dalley (2007) examined regulatory disclosure systems in US, using the securities laws as a paradigm, in an effort to determine when and how disclosure systems work and to provide guidelines for the use of disclosure by regulators. The author concluded that every disclosure scheme must have an articulated purpose; an identified mechanism through which it can accomplish that purpose; a design that takes into account the operation of that mechanism; and a careful analysis showing that the benefits of the system outweigh its costs. For EU Member States, MiFID is applied, representing a paradigm shift in the EU process of building a securities market. MiFID aims at removing the obstacles faced by companies in using the European „passport" for investment, encouraging competition and ensuring a high level of investors' protection across Europe. The disclosure behaviour of a sample of listed Swedish and UK pharmaceutical companies was investigated by Gray and Skovsik (2004). They studied the annual financial reports of a sample of three Swedish and three UK pharmaceutical companies, for the period between 1984 and 1998, and they found that in both countries the companies have provided substantial disclosures relevant for the assessment of competitive advantages, especially with regard to research and development activities. However, disclosures concerning business growth, dividend policy and earnings persistence have been more prevalent among the Swedish companies.

Hypothesis

While the impact of financial information disclosure on companies' market values is largely analysed for developed countries, fever studies have been carried out in the case of emerging markets (Reddy, 2001; International Valuation Standards Committee, 2003; Prasad, 2009).

Our study focuses on the effects of disclosed financial and non-financial information on stock prices in the case of an emergent market as the Romanian one. In particular, we study if the publicly disclosed information via companies' websites is able to affect investors' decisions even for markets with low liquidity, sticky prices and incomplete functional and institutional development. The choice of the Romanian case is motivated by that Bucharest Stock Exchange clearly displays such characteristics. This market is characterized by one of the lowest capitalization among the Central and Easter European countries, with relatively inefficient market allocation mechanisms and a reduced set of tradable financial assets.

The prior discussion of literature led to our research hypothesis about the incremental value relevance of the financial and non-financial information:

> ***H*:** In *caeteris paribus* conditions, there will be a relative incremental value of a higher volume and a better quality of information reflecting prices' overreactions even for a market with imperfect trading mechanisms. However, less sophisticated investors' behaviours and a greater heterogeneity of prices' adjustments under the impact of the disclosed information is expected for such a market in comparison with more developed ones.

3. DATA AND METHODOLOGY

The sample

We obtained financial and non financial disclosure data from the Bucharest Stock Exchange and Bolsa de Madrid as well as from the corporate websites. The data were supplemented by using annual and interim financial reports. We included in the final sample only companies that have identifiable

information on *Prices / Earnings Ratio* (PER) and other complete data for all variables used in our models. In order to test our working hypothesis, we have constructed five dummy variables: 1) *Website in domestic language;* 2) *Website in at least one foreign language* (English); 3) *Disclosure of annual financial reports*; 4) *Disclosure of interim financial reports*; 5) *News* (non-financial information). Details about the construction of these dummies are provided in Data Appendix (Table A.1). All the values are corresponding to the third quarter of 2010.

Table A.2 summarizes the sample selection process, showing the number of observations excluded from the initial sample, and the resulting final sample. Of the initial sample of 72 companies listed on Bucharest Stock Exchange, 27 are excluded due to the absence of PER information, resulting in a sample of 45 non-financial companies and financial institutions. From the companies included in the structure of IBEX 35 Bolsa de Madrid index, all are considered.

Using Spanish capital market as a benchmark

In order to provide a benchmark for our results, we are comparatively analyzing the case of companies listed on the Spanish capital market. There are several arguments for such a choice. Firstly, there are some recent functional similarities for both capital markets in the context of current financial and economic turmoil, despite their large structural, functional and institutional differences (see Table A.3. from the Data Appendix for some key figures for the Romanian and Spanish economies and capital markets).

Since it has reopened in 1995, the Romanian capital market with the main component - the Bucharest Stock Exchange (BSE) - has registered different phases of evolution: 1) the reconstruction phase (1995-1996) with the development of institutional and functional infrastructure; 2) the first instability phase (1997-2000), when the BSE experienced a generalized instability, insufficient liquidity and severe frictions at the level of the insufficient developed mechanisms; 3) the sustainable evolution phase (2001-2005) characterized by a dominant upward trend, significant increase in market capitalization and higher correlations with other international markets; 4) the first uncertainty phase (2006-2007) with important peaks in volatility and frequent changes in trends; 5) the turbulence phase

when in the context of international real and financial instability, the Romanian market was characterized between 2007- first part of 2009 by persistent downward trends and the increase of the market intrinsic volatility as an expression of the unbalanced bid/ask ratio due to higher risks in the transactional environment; 6) the second actual uncertainty phase when a new upward trend starts to develop but in an not yet consolidated manner.

As Dănescu et al. (2010) note: "As a member of European Union, Romania has transposed MiFID Directive in national capital market legislation. Still, local investment firms have difficulties in addressing the requirements they need to fulfil, due to lack of adequate financial and human resources". It is also hard to presently evaluate the extent to which Romanian financial system allows a de facto abolishment of the so-called 'concentration rule' and to expose Bucharest Stock Exchange to competition from multilateral trading facilities (MTFs), i.e. broadly non-exchange trading platforms and 'systematic internalisers', i.e. banks or investment firms which systematically execute client orders internally on own account, as required by the Directive.

Comparatively, as Biscarri and Gracia (2004) have found, the Spanish stock market has become increasingly similar to those of the more developed countries, although some differences still persist. The Stock Market Law enacted in July 1989 set a new institutional market framework. A new monitoring institution (the National Stock Market Commission) was created, and more detailed informational requirements were specified, especially for primary markets participants. Other secondary markets, most noticeably those for financial derivatives, were added shortly afterwards. The Continuous Market began to function in April of 1989. This institutional construction was ensuring a corresponding degree of liquidity and openness. Still, there are some particularities which are differentiating the Spanish capital market from other developed ones. For instance, Biscarri and Gracia (2004) document that average duration for both bull and bear phases are greater in the case of Spain comparing with others developed markets despite the fact that post-2001 this duration was shorter. Also, the amplitude for the bull phase remains, after a substantial diminution, somehow larger for Spanish market. As for Romanian market, it displays all the characteristic features of an emergent one, with slow prices' adjustment mechanisms and their effects on longer market cycles.

Secondly, there are some recent evidences of an increased cointegration of the Romanian capital market with the European ones. Thus, it can be argued that, at least for the most liquid stocks, there should be a certain degree of synchronization in market dynamics with individual European markets. In order to evaluate this hypothesis, we are testing the cointegration between the Romanian market ROTX index and the Spanish market IBEX35 index. ROTX is a free float weighted capitalization index and reflects in real time the prices' movements of "blue chip" companies traded on the Bucharest Stock Exchange. Being calculated also in EURO and disseminated in real time by the Wiener Borse, this index is suitable for cross-countries analyses.

Since overall Kwiatkowski et al. (1992) unit root tests tend to reject the null of returns' stationarity, we are performing a cointegration analysis between the indexes returns by involving the Engle and Granger (1987) and Phillips and Ouliaris (1990) cointegration tests. Table A.4 report the results. It appears that both tests are rejecting the null hypothesis of no cointegration between the two indexes. Of course, such a result should be considered with caution and a more detailed analysis of the driving mechanisms for such a possible relationship between the Romanian and Spanish markets' phases is required. But, at least, it can be argued that some functional connections between these markets are starting to be in place driven by the Romanian integration in European Union process.

Methodology

In order to carry out our analysis, we appeal to the Generalized Linear Models (GLM) estimation framework. This methodology allows flexible specifications of the model and "for non-normal data without clustering, generalized linear models are an appropriate alternative to linear models" (Tuerlinckx et al., 2006: 225). Such flexibility is required since the estimation procedure must be robust enough in order to deal with at least two sources of variables heterogeneity: a) the imperfections of prices' mechanisms for the Romanian market and b) the effects of the differences between IFRSs and Romanian GAAP.

The strategy of the baseline model formulation is based on a stepwise addition of several explanatory variables to the GLM framework with the lowest ρ-value at the ten percent level. Such a bottom-up

approach has several advantages, since we are assuming the existence of various relations among the involved variables (see for arguments Lütkepohl, 2007). Thus, we start by analyzing the relevance of individual disclosure dummies in order to retain only the relevant ones. Furthermore, the disclosure dummies are aggregated in order to produce a global disclosure indicator by using the so-called *principal components analysis*. This procedure models the variance structure of a set of observed variables using linear combinations of the variables. These linear combinations (*components*) may be used in subsequent analysis, and the combination coefficients (*loadings*) can be used for a subsequent interpretation of the *components*. The global indicator is constructed by weighting the individual disclosure dummies with these *loadings*. Details on the procedure are provided in the Appendix. We are involving such approach since: (a) this is a procedure of reducing the number of observed variables to a smaller number of *principal components,* which account for most of the variance of the observed variables; (b) we are expecting the dummies to be highly correlated; (c) component scores are a linear combination of the observed variables weighted by eigenvectors and, so, it allows for considering the relative importance of individual variables. Such global indicator is designed to be use for an overall assessment of disclosure impact on PER ratios.

The general specification of the model is non-linear of the form:

$$PER_i = \exp\left(\alpha + \beta Disclosure_i + \phi X_i\right) + \varepsilon_i$$
$$\varepsilon_i \sim Pois\left(IFRSs_i, \mu_i\right) \qquad (1)$$

Here, *PER* is *Prices to Earnings ratio* for individual company *i*, Disclosure represent the financial and non-financial information dummies and *X* are the other explanatory variables considered in the robustness check.

Such a specification falls into the GLM framework with a log link function and Poisson family distribution. *Disclosure* represents other explanatory variables included together with the disclosure dummies. The specification can be justified by the complexity of involved associations between the prices' mechanisms and information disclosure. Indeed, it seems implausible that the effects induced by this disclosure can affect the PER ratios only in a linear fashion.

It must be noticed that we are choosing as dependent variable the PER ratios, since these reflect the prices adjusted with the issuers' economic and financial performances. Thus, this variable is supposed

to capture not only the efficiency of the prices' mechanisms, but also their alignment to market values of companies as these are based on the fundamental determinants related to issuers' activity.

Descriptive statistics

Table 1 presents the number of sample companies and the mean, maximum, minimum and standard deviations of PER and individual explanatory variables for both capital markets. The figures in the first row for each country are PER values (2010 reference) computed based on net profit for the last 4 quarters / last annual report issued according to the local GAAP. If the starting trade date is smaller than 4 quarters, the values are computed accordingly, by considering the last available quarters reports.

[Insert Table 1 about here]

The other five rows are the individual disclosure dummies. The values of dispersion, significantly larger in the Romanian case, are suggesting the existence of some outliers in variables especially for the PER ratios. More exactly, for 14 Romanian companies (31%) the values of the PER are greater than 20 and 6 (13%) are higher than 40. These outliers are especially located in petroleum, transports and constructions' sectors of Bucharest Stock Exchange. 9 companies (20%) do not have websites in foreign languages and 12 companies (26, 7%) are not reporting annual or interim financial situations on their websites. Finally, 11 companies (24, 4) do not have an explicit or implicit news section. For IBEX35 companies, the outliers are located especially in energy, industry and financial sectors. 3 companies (8.57%) from the dataset do not provide a version of their websites in any foreign language.

Principal Components Analysis

Table 2 and Table 3 are reporting the results of the principal component analyses for Romanian and Spanish markets. The first section of these tables summarizes the eigenvalues, showing the values, the forward difference in the eigenvalues and the proportion of total variance explained. Since we are performing principal components on a correlation matrix, the sum of the scaled variances for the five dummies is equal to 5. The first principal component accounts for 87% of the total variance of

Romanian companies PER ratios (99% in the case of Spanish companies), while the second accounts for 7% (15%) of the total. The first two components account for over 95% (100%) of the total variation.

[Insert Table 2 about here]

[Insert Table 3 about here]

The second section describes the linear combination coefficients. It can be noticed that the first principal component (labelled "PC1") is a roughly-equal linear combination of all five disclosure dummies. Thus, it might reasonably be interpreted as a global disclosure indicator. The second principal component (labelled "PC2") has negative loadings for the disclosure of financial statements in the Romanian case and positive loadings for all others dummies which appears to represent a non-financial information specific component. In the case of Spanish companies, all the loadings of the second principal components, except the one corresponding to the news dummy, are negative. Such values of loadings can suggest for a more complex decisional behaviour of investors on the Spanish market.

The output of the principal components analysis can be used to construct global indicators of financial and non-financial information disclosure. Such indicators are susceptible to describe in a synthetic manner the public available information at the disposal of investors as it is this provided by the issuers.

4. RESULTS AND ROBUSTNESS CHECK

Main results

The scatter diagrams from Figure 1 indicate a positive relationship between PER values and disclosure indicator. However, while the shape of this relationship, fitted with *Nearest Neighbour Fit* method as described by Cleveland (1994), appears to be close to a linear one in Spanish companies' case, is clearly non-linear for the Romanian ones. Thus, a more analytical approach is needed.

[Insert Figure 1 about here]

Columns 1 and 2 of Table 4 report the individual GLM estimations of the baseline regressions between PER values and disclosure variables both for Romanian and Spain companies. *Ex ante*, we expect positive coefficients for all explanatory variables. As shown in these columns, the estimated coefficients of all five disclosure variables are positive and statistical significant at 1%. Considering the values of the estimated coefficients and t-statistics, it appears that the existence of Internet disclosure in local language and the report of annual financial statements are the most powerful explanatory variables for Romanian companies' PER levels.

[Insert Table 4 about here]

In the mean time, the benchmark values for Spanish companies reflect a different pattern. The most important difference consists in a significantly higher relative importance of non-financial news together with financial information disclosure. Such results can be viewed as supporting our first research hypothesis, since these imply a more sophisticated decisional behaviour in the case of the investors on Spanish market. However, it should be noticed that the levels of estimated coefficients are not significantly different on the two markets. In other words, a preliminary result is that the prices' overreactions to an increased disclosure of information differs more in terms of determinants that in terms of intensity. Distinctively, it appears that a website in a foreign language has for the Romanian companies a less important impact on their market prices, whereas annual and interim financial reports exercise deeper effects. The same situation is characteristic to the Spanish companies. We interpret such outcome as a result of an only partial openness to foreign investors for the two markets. A similar pattern appears for news dummies. Thus, it can be considered that there is a certain prevalence of financial information importance in the determination of market values over the non-financial one.

Also, we examine the incremental value relevance of the joint vector of foreign languages site, disclosure of annual and interim financial reports and news, when the website in local language is already included in regressions. The *Likelihood ratio* (LR) statistic clearly shows that this incremental value cannot be neglected for these variables. Thus, a higher degree of financial and non-financial information disclosure can contribute even in the case of Romanian issuers to a greater preference of investors for including the corresponding stocks in their portfolios.

Robustness

The robustness of this output can be checked, for instance, by modifying the estimation procedure. The modifications might refer to: 1) changes in optimization procedure for GLM frame and 2) changes in methodology.

Thus, columns 3 and 4 of Table 4 present the results obtained when the optimization procedure shifts from *BHHH* algorithm to the so-called *Quadratic Hill Climbing* algorithm. With the exception of minor modifications in t-statistics, there are no significant changes in the relevance of considered variables with such shift. Columns 5 and 6 of the same table display the results of *quantile regression* estimation. Originally proposed by Koenker and Bassett (1978), *quantile regression* provides estimates of the linear relationship between regressors and a specified quantile of the dependent variable. One important special case of quantile regression is the *least absolute deviations* (LAD) estimator, which corresponds to fitting the conditional median of the response variable. Such method permits a more complete description of the conditional distribution than conditional mean analysis alone and, since does not require strong distributional assumptions; it offers a distributional robust method of modelling the relationship between different percentiles of dependent and the explanatory variables. We employ a bootstrap estimation (10000 replications) based on the *Markov Chain Marginal Bootstrap* (MCMB) in the version developed by Kocherginsky et al. (2005). This version alleviates the autocorrelation problems that can appear in the standard version of MCMB by prior transforming the parameter space; and, after the performing of the MCMB algorithm, transferring the results back to the original space. This methodology substantially improves the significance of the estimated parameters. However, it can be observed that for the Spanish listed companies, this approach substantially modifies the values of the coefficients compared to the previous obtained estimators. Now, the intensity of prices' overreactions appears to be higher for Spanish stocks suggesting a higher degree of adjustments' speed to informational shocks.

Finally, for comparison purposes, columns 7 and 8 of Table 4 are reporting a basic OLS estimation. Such estimation produces higher estimated coefficients for all the involved variables, but does not change their relative importance.

Overall, the same positive effects of a larger volume of disclosed information on PER' levels are revealed by different estimation procedures. The same pattern is preserved if the global disclosure indicator is considered as explanatory. For all the estimation procedures, the values of the corresponding coefficients are higher in the case of Romanian companies comparing with the Spanish ones. Again, the quantile regression produces larger coefficient for both countries. One possible explanation can be found by verifying the quantile process stability. For instance, it can be applied a *Symmetric Quantiles Test* as developed in Newey and Powel (1987). In this approach, conditional symmetry implies that the average value of two sets of coefficients for symmetric quantiles around the median will equal the value of the coefficients at the median:

$$\frac{\beta(\tau)+\beta(1-\tau)}{2}=\beta(0.5) \quad (2)$$

Since in our estimation the model fits the median, there is a single set of restrictions:

$$\frac{\beta(0.25)+\beta(0.75)}{2}=\beta(0.5) \quad (2.1)$$

In other words, the test compares estimates at the first and third quartile with the median specification. For the Spanish companies, the value of the test equals 0.93 while for Romanian ones this equals 0.18. Hence, there can be highlighted a significant decisional heterogeneity of Romanian market investors to a greater volume of disclosed information, but there is little evidence of a symmetry departure on Spanish market. It can be argued that such evidence support the thesis that the investors' behaviour on an emergent market such the Romanian one is less systematic and is influenced in a non-uniform manner by informational shocks.

For the Romanian market stocks, a cautionary note must be considered especially for second and third tiers. For these stocks, there are not necessary continuous daily trading data and important volumes of transactions can be done outside of the organized market. Thus, it can be assumed that the dependent variable is only "partially observed" since the non-market prices are not included in PER' estimations. Even more, there can be important prices' gaps between successive transactions due to low market liquidity. In order to account for such situations, a latent variable regression model can be seen as:

$$PER_i=\beta Disclosure\_Indicator'_i+\sigma\varepsilon_i \quad (3)$$

Here σ is a scale parameter that can be identified through censored and truncated regression models and can be estimate along with β. Such estimations are reported in Columns 9 and 10 of Table 4. Both left and right censoring arbitrary values (1, and, respectively, 62 which represents the next lower / higher integer to the minimum / maximum values of PER) are taken into account. For the distributions of error terms, an *extreme distribution* with $\varepsilon_i \approx -0.5772\left(\text{Euler's constant}\right), \text{var}\left(\varepsilon\right) = \frac{\pi^2}{6}$ is involved. Such an asymmetric type of distribution is designed to reflect the heterogeneity of PER' values and the non-uniform reactions of investors to an increase in information disclosure. It appears that the estimated coefficients are in Romanian case significantly higher for this approach compared to the previous ones. We interpret this as an empirical evidence of prices' mechanisms imperfections, typical for an emergent market.

Another robustness issue concerns the impact of companies' dividend policies. Indeed, it can argued that dividends transmit a clear image about the company' financial health and constitute a synthetic indicator of stocks' returns. Also, dividends are free from periodical shocks; such as "write-offs" which can affect earnings. Thus, it can be expected an important predictor capacity of dividends for prices' levels. For instance, a study of Aras and Yilmaz (2008) on 12 emerging markets find that market-to-book ratio stands to reveal significant results in terms of predicting stock returns for a one-year period among others for most of the emerging market countries, while dividends yields come in second place. In order to test for dividend policy relevance, we are adding dividends per equity (domestic currency) as a control variable (last two columns, 11 and 12, of Table 4). Surprisingly, we did not find any statistical relevance of this variable for PER ratios. The disclosure indicator remains significant at 1% and with coefficients' estimators close to the GLM estimations without control variable.

Overall, these results are supporting our research hypothesis by evidencing non-uniform reactions in prices' level to an increase in the volume of Romanian market available information. Also, these results are enforcing the necessity to account for functional and institutional differences in analyzing emerging markets and for the different determinants of investors' decisions compared to the developed markets. A subsequent result concerns the benchmark case of Spanish companies for which our

analysis reveals the relevance of financial information for stocks valuation compatible with other studies (Aharony et al., 2010).

5. CONCLUSIONS

The adoption into European Union's Member States legislations of the MiFID Directive and its de facto implementation require a profound shift in the information disclosure principles and practices in order to increase the volume and quality of public information and to enhance the accuracy of investors' decisions. But the application of the Directive faces several difficulties especially in the case of new emergent Member States. We have examined the current stage of information disclosure and its effects on market prices for Romanian companies listed on Bucharest Stock Exchange. In addition, we have involved the Madrid Stock Exchange companies as a benchmark case for our results.

We expect a positive impact of an increased amount of disclosed information even for a market with rigid prices' mechanisms as the Bucharest Stock Exchange but with large heterogeneity of prices' adjustments and less complex portfolio management decisions. Our findings provide some empirical support for our research hypothesis: (1) all the disclosure variables are positive and significantly associated to PER ratios overreactions for both markets; (2) the effects exercised by the disclosure of non-financial information are less clear in the case of Romanian companies compared to the Spanish ones; (3) the intensity of prices' overreactions appears to be higher for Spanish stocks, suggesting a higher degree of adjustment speed to informational shocks; (4) the global disclosure indicator constructed base on principal components analysis methodology is positive and significant related to larger PER ratios values for both markets, but the amplitude of such relationship tends to be greater for the Bucharest Stock Exchange.

We have performed a robustness check by modifying the estimation methodology and complementing the analysis by adding a descriptor of issuers' dividend policies. We are finding that our results are robust in respect to the estimation procedures' changes, but we are not able to found any statistical relevance of dividend per share for the levels of PER ratios.

Overall, these results suggest a clear post-MiFID adoption relevance of disclosed information both in an emerging as well as in a developed European Union markets. Still, these results should be interpreted with caution for at least four reasons. Firstly, we document a positive effect post-MiFID adoption in an emergent market, but we do not evaluate the costs involved by such an adoption. Supplementary, the implementation in practice of the Directive requirements is far from complete in the Romanian case. Further research may examine whether the benefits outweigh the costs especially in more advanced implementation phases. Secondly, we take into account the impact of highly aggregated disclosure dummies on prices mechanisms without considering more details for each individual variable. Consequently, it is possible that our findings are not generally applicable to individual informational items. Future studies should provide a more detailed analysis. Thirdly, we use as dependent only the PER ratios while other market values estimators with possible different reactions to information disclosure are not considered. The examination of cross-countries data does not allow us to complete the dataset with this value for all companies listed on Bucharest Stock Exchange, especially, for second and third tiers. Finally, we do not study the changes over time in market informational efficiency. Further research may examine whether potential changes in this efficiency provide an alternative explanation for observed differences in the incremental value of disclosed financial and non-financial information between emergent and developed markets eventually by considering a larger dataset.

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APPENDIX: *Principal Component Analysis*

Principal components analysis is a variable reduction procedure. Thus, it is similar in many respects to exploratory factor analysis but there are significant conceptual differences between these two procedures. Perhaps, one of the most important differences deals with the assumption of an underlying causal structure: factor analysis assumes that the co-variation in the observed variables is due to the presence of one or more latent variables (factors) that exert causal influence on these observed variables. In contrast, principal component analysis makes no such special assumptions about an underlying causal model and permits the analysis of more various empirical situations. Its central idea is to reduce the dimensionality of a set of interrelated variables, while retaining as much as possible from the variation which is present in dataset. The procedure is currently widely applied from climatology to economics, genetics, psychology or quality control (see for details Jolliffe, 2002).

This type of analysis models the variance structure of a set of observed variables by using linear combinations of the variables. These linear combinations, or *components*, may be used in subsequent analysis, and the combination coefficients, or *loadings*, may be used in interpreting the components.

The *principal components* of a set of variables are obtained by computing the eigenvalue decomposition of the observed variance matrix. The first *principal component* is the unit-length linear combination of the original variables with maximum variance. Subsequent *principal components* maximize variance among unit-length linear combinations that are orthogonal to the previous components.

From the singular value decomposition, a (*nxp*) data matrix Y of rank r could be represented as:

$$Y = UDV' \qquad (a.1.)$$

U and V are orthonormal matrices of the left and right singular vectors, and D is a diagonal matrix containing the singular values.

More generally, one could write:

$$Y = AB' \qquad (a.2.)$$

A is an *(nxr)*, and B is a *(pxr)* matrix, both of rank r, and

$$A = n^{\frac{\beta}{2}} UD^{1-\alpha}$$
$$B = n^{\frac{-\beta}{2}} VD^{\alpha} \qquad (a.3.)$$

Thus $0 \leq \alpha \leq 1$ is a factor which adjusts the relative weighting of the left (observations) and right (variables) singular vectors, and the terms involving β are scaling factors where $\beta \in \{0, \alpha\}$.

The basic options in computing the scores *A* and the corresponding loadings *B* involve the choice of (loading) weight parameter α and (observation) scaling parameter β.

In the *principal components* context, let $\sum$ be the cross-product moment (*dispersion*) matrix of *Y*, and let perform the eigenvalue decomposition:

$$\sum = L\Lambda L' \qquad (a.4.)$$

Here *L* is the *pxp* matrix of eigenvectors and Λ is the diagonal matrix with eigenvalues on the diagonal. The eigenvectors, which are given by the columns of *L*, are identified up to the choice of sign. It could be observed the facts that since the eigenvectors are by construction orthogonal, $L'L = LL' = I_m$.

There could be done some settings as $U = YLD^{-1}, V = L, D = (n\Lambda)^{\frac{1}{2}}$, so that:

$$A = n^{\frac{\beta}{2}} YLD^{-\alpha}$$
$$B = n^{-\frac{\beta}{2}} LD^{\alpha} \qquad (a.5.)$$

A can be interpreted as the *weighted principal components scores*, and *B* as the *weighted principal components loadings*.

Others detail of this procedure concerns an appropriate choice of the weight parameter α and the scaling parameter β through which different *scores* and *loadings* with various properties could be constructed.

DATA APPENDIX

Table A.1. Dependent and explanatory variables

VARIABLE	DESCRIPTION	SOURCE
Prices / Earnings Ratio	Is a measure of the price paid for a share relative to the annual net income or profit earned by the firm per share	Bucharest Stock Exchange (2010) and Bolsa de Madrid (2010)
Website in domestic language	Dummy variable which takes value of "1" if there is a company' website in domestic language and "0" otherwise	Coded by authors based on companies' websites
Website in at least on foreign language (English)	Dummy variable which takes value of "1" if there is a company' website in at least one foreign language (from official European Union languages) and "0" otherwise. If there are website versions in more than one foreign language, the variable takes also the value of "1"	Coded by authors based on companies' websites
Disclosure of annual financial reports	Dummy variable which takes value of "1" if on company' website are disclosure the annually financial reports and "0" otherwise	Coded by authors based on companies' websites
Disclosure of interim financial reports	Dummy variable which takes value of "1" if on company' website are disclosure the interim financial reports and "0" otherwise	Coded by authors based on companies' websites

News	Dummy variable which takes value of "1" if on company' website are disclosure information with potential impact on economic and financial performances and "0" otherwise	Coded by authors based on companies' websites

Table A.2. Sample construction of publicly listed companies in Romania and Spain

Romania				
	Total number of companies	Number of companies in final sample	Non available PER data	Non available / non functional website
First tier	22	22 (100%)	-	-
Second Tier	49	23 (47%)	26 (53%)	-
Third tier	1	0 (0%)	1 (100%)	-
Total	72	45 (62.5%)	27 (37.5%)	-
Spain				
IBEX 35	35	35	-	-

Table A.3. Key data of Romanian and Spanish capital markets and economies

	Market capitalization (USD millions)		Number of listed companies		GDP per capita (curent USD)		FDI net inflows (BoP, currentUSD millions)	
	Romania	Spain	Romania	Spain	Romania	Spain	Romania	Spain
1995	100.37	150914.23	9	-	1564	15151	419	8086
1996	60.81	241028.10	17	-	1563	15766	263	9623
1997	632.43	290354.80	76	-	1565	14467	1215	8937
1998	357.14	399847.60	126	-	1872	15126	2031	14282
1999	316.81	431649.20	127	-	1585	15476	1041	18523
2000	415.96	504221.90	114	-	1651	14422	1037	38835
2001	1228.52	468203.21	65	-	1816	14958	1157	28164
2002	2717.51	461559.57	65	-	2102	16611	1144	39993
2003	3710.22	726243.37	62	-	2737	21037	1844	25607
2004	11937.56	940672.88	60	-	3481	24461	6443	24792
2005	18184.81	959910.39	64	-	4572	26042	6482	24573
2006	28204.04	1322915.30	58	3378	5681	27989	11393	31172
2007	35326.04	1781132.66	59	3537	7856	32105	9925	66682
2008	16272.56	948352.29	68	3576	9300	35000	13883	74226
2009	27455.68	1434540.46	69	3472	7500	31774	6310	6451

Source of data: Bucharest Stock Exchange (2010) for Romanian market and World Federation of Exchanges (2010) for Spanish market; For economic data: World Bank (2010).

Table A.4. Testing the cointegration between Romanian ROTX and Spanish IBEX market indexes' returns

A) Kwiatkowski, Phillips, Schmidt, and Shin unit root tests

	LM-Statistic
ROTX	0.60
IBEX	0.19

Notes: Null hypothesis: The return series is stationary; Critical values: 1%- 0.74; 5%- 0.46; 10%- 0.35; Constant included; Bandwidth: 2 (*Newey-West* procedure selection) using *Bartlett kernel*

B) Engle-Granger and Phillips-Ouliaris cointegration tests

	Tau-statistic
Engle-Granger test	
ROTX	-3.67 [-39.63] (0.00)
IBEX	-30.96 [-826.82] (0.00)
Phillips-Ouliaris test	
ROTX	-27.53 [-719.74] (0.00)
IBEX	-32.00 [-731.94] (0.00)

Notes: z-statistics in [] and probabilities in ();Null hypothesis: Series are not cointegrated; Cointegrating equation deterministics: constant;For Engle-Granger test: Lags specifications based on *Modified Hannan-Quinn* Info Criterion; For Phillips-ouliaris test:Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth).

Table 1. Summary statistics of Prices / Earnings Ratios and Disclosure Indicators

	Mean		**Maximum**		**Minimum**		**Standard deviation**	
	Romania	Spain	Romania	Spain	Romania	Spain	Romania	Spain
Prices / Earning Ratio	18.68	12.82	61.00	31.74	1.94	4.07	14.43	7.11
Website in domestic language	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Website in at least on foreign language (English)	0.78	0.91	1.00	1.00	0.00	0.00	0.42	0.29
Disclosure of annual financial reports	0.73	1.00	1.00	1.00	0.00	1.00	0.45	0.00
Disclosure of interim financial reports	0.76	1.00	1.00	1.00	0.00	1.00	0.43	0.00
News	0.76	1.00	1.00	1.00	0.00	1.00	0.43	0.00

Table 2. *Principal Components Analysis* (Romania)

Eigenvalues: (Sum = 6, Average = 1)

Number	**Value**	**Difference**	**Proportion**	**Cumulative Value**	**Cumulative Proportion**
1	4.36	3.99	0.87	4.36	0.87
2	0.37	0.19	0.07	4.72	0.95
3	0.18	0.09	0.04	4.90	0.98
4	0.09	0.07	0.02	4.99	1.00
5	0.01	---	0.00	5.00	1.00

Eigenvectors (loadings):

Variable	**PC 1**	**PC 2**	**PC 3**	**PC 4**	**PC 5**	**PC 6**
Website in domestic language	0.46	0.20	0.14	-0.85	0.01	0.46
Website in at least one foreign language (English)	0.44	0.22	-0.86	0.15	0.03	0.44
Disclosure of annual financial reports	0.46	-0.48	0.12	0.15	-0.73	0.46
Disclosure of interim financial reports	0.45	-0.53	0.15	0.15	0.69	0.45
News	0.43	0.63	0.46	0.45	0.01	0.43

Notes: Included observations: 45; Computed using: Ordinary (uncentered) correlations; Extracting 5 of 5possible components.

Table 3. *Principal Components Analysis* (Spain)

Eigenvalues: (Sum = 6, Average = 1)					
Number	**Value**	**Difference**	**Proportion**	**Cumulative Value**	**Cumulative Proportion**
1	4.93	4.85	0.99	4.93	0.99
2	0.07	0.07	0.01	5.00	1.00
3	0.00	0.00	0.00	5.00	1.00
4	0.00	0.00	0.00	5.00	1.00
5	0.00	---	0.00	5.00	1.00

Eigenvectors (loadings):						
Variable	**PC 1**	**PC 2**	**PC 3**	**PC 4**	**PC 5**	**PC 6**
Website in domestic language	0.45	-0.22	0.57	-0.65	-0.02	0.45
Website in at least one foreign language (English)	0.45	-0.22	-0.80	-0.33	0.00	0.45
Disclosure of annual financial reports	0.45	-0.22	0.12	0.47	0.72	0.45
Disclosure of interim financial reports	0.45	-0.22	0.11	0.50	-0.70	0.45
News	0.44	0.90	0.00	0.00	0.00	0.44

Notes: Included observations: 35; Computed using: Ordinary (uncentered) correlations; Extracting 5 of 5possible components.

Table 4. Disclosure and PER overreaction

	Model 1 (GLM-*BHHH optimization* method)		**Model 2 (GLM-*Quadratic Hill Climbing optimization* method)**		**Model 3 (Quantile Regression-median)**		**Model 4 (OLS)**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Romania	Spain	Romania	Spain	Romania	Spain	Romania	Spain
Website in domestic language	2.93*** (25.50)	2.55*** (26.42)	2.92*** (25.42)	2.55*** (26.41)	2.93*** (25.50)	10.78*** (12.51)	18.68*** (7.78)	12.82*** (10.54)
Website in at least one foreign language (English)	2.78*** (4.28)	2.57*** (13.78)	2.78*** (4.28)	2.57*** (13.77)	2.78*** (4.28)	10.78*** (11.27)	16.13*** (6.91)	13.01*** (10.13)
Disclosure of annual financial reports	3.01*** (8.91)	2.55*** (26.42)	3.00*** (8.89)	2.55*** (26.41)	3.01*** (8.91)	10.78*** (12.51)	20.26*** (7.20)	12.82*** (10.54)
Disclosure of interim financial reports	3.00*** (9.39)	2.55*** (26.42)	3.00*** (9.37)	2.55*** (26.41)	3.00*** (9.39)	10.78*** (12.51)	20.17*** (7.37)	12.82*** (10.54)
News	2.80*** (4.11)	2.55*** (26.42)	2.80*** (4.10)	2.55*** (26.41)	2.80*** (4.11)	10.78*** (12.51)	16.51*** (9.27)	12.82*** (10.54)
Disclosure Indicator	1.43*** (12.32)	1.15*** (26.53)	1.42*** (12.28)	1.15*** (26.51)	6.46*** (5.03)	5.07*** (14.14)	9.44*** (8.12)	5.83*** (10.84)
Dividend per equity (domestic currency)								
Number of observations	45	35	45	35	45	35	45	35
Likelihood ratio (LR) statistic	0.02		0.03		0.11		0.001	

	Model 5 (ML-Censored Extreme Value)		**Model 6 (GLM-*BHHH optimization* method)**	
	(9)	(10)	(11)	(12)
	Romania	Spain	Romania	Spain

Disclosure Indicator	13.46*** (7.55)	7.59*** (11.09)	1.46*** (9.92)	1.12*** (18.39)
Dividend per equity (domestic currency)			-0.03 (0.71)	0.18 (0.82)
Number of observations	45	35	45	35

Notes: ***, **, and * represent statistical significance at 1%, 5%, and 10% level. Figures in bracket represent the t- statistic; For the Generalized Linear Model estimations: a) *Family*: Poisson; b) Link function: Log; c) Optimization algorithm: *BHHH* (Model 1) and, respectively, *Quadratic Hill Climbing* (Model 2); For Quantile Regression estimation (Model 3): a) Coefficient covariance: Bootstrap (10000 replications); b) Sparsity estimation: *Siddiqui (mean fitted)* - bandwidth method: *Hall-Sheather* (size parameter: 0.05); c) Random generator: *Knuth*; d) Bootstrap method: *Markov Chain Marginal* (as modified by Kocherginsky, He, and Mu, 2005); For Co-integrating Regression: Estimation method: *Fully-modified OLS*; For Co-integrating regression: Long-run variance calculation: a) Kernel: *Tukey-Parzen*; bandwidth method: Newey-West selection; The Likelihood ratio (LR) statistic is testing the significance level of the joint vector of foreign languages site, disclosure of annual and interim financial reports and news when the website in local language is already included. The null is: the additional set of regressors is not jointly significant; For ML-Censored Extreme Value: a) Optimization algorithm: *Quadratic Hill Climbing*; b) Distribution: *Extreme Value*.

Figure 1. Scatter Plot of Prices / Earnings Ratios vs. Disclosure Indicator